Appl. No. 10/058,214

Reply to Office Action of: December 12, 2005

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of claims:

- 1. (currently amended) A method of providing a point multiple in an elliptic curve cryptosystem for performing cryptographic operations, said point multiple being derived from a scalar and a point on an elliptic curve having an equation of the form $y^2 + xy = x^3 + a_1x^2 + 1$, where a_1 is either 0 or 1, said method comprising the steps of:
 - a) obtaining a pair of coefficients derived from a truncator of said elliptic curve;
 - b) computing a representation of said scalar from said pair of coefficients, said scalar, and said truncator of said elliptic curve;
 - c) computing said point multiple using said representation of said scalar and a Frobenius mapping τ; and
 - d) providing said point multiple to said elliptic curve cryptosystem for use in said cryptographic operations[[.]];

wherein said truncator is $\frac{\tau^m - 1}{\tau - 1}$, and wherein m is the extension degree of a finite field over which said elliptic curve is defined.

- 2. (original) A method according to claim 1, wherein said pair of coefficients corresponds to an approximation of the inverse of said truncator.
- 3. (original) A method according to claim 2, wherein said approximation is determined by a significance parameter.
- 4. (original) A method according to claim 1, wherein said representation of said scalar is equivalent to said scalar modulo said truncator.
- 5. (original) A method according to claim 2, further comprising the step of computing a

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quotient derived from said pair of coefficients and said scalar and using said quotient to perform the step of computing said representation of said scalar.

- 6. (original) A method according to claim 5, wherein said quotient is equivalent to a product of said scalar and said approximation of said inverse of said truncator.
- 7. (original) A method according to claim 6, wherein said representation of said scalar is equivalent to a remainder after division of said scalar by said truncator.
- 8. (cancel)
- 9. (currently amended) A method of computing a key for use in a cryptographic system, said key being derived from a scalar and a point on an elliptic curve having an equation of the form $y^2 + xy = x^3 + a_1x^2 + 1$, where a_1 , is either 0 or 1, said method comprising the steps of:
 - a) obtaining a pair of coefficients derived from a truncator of said elliptic curve;
 - b) computing a representation of said scalar from said pair of coefficients, said scalar, and said truncator of said elliptic curve;
 - c) computing a point multiple using said representation of said scalar and a Frobenius mapping τ; and
 - d) using said point multiple for computing said key for use in said cryptographic system[[.]];

wherein said truncator is $\frac{\tau^m - 1}{\tau - 1}$ and wherein m is the extension degree of a finite field over which said elliptic curve is defined.

- 10. (currently amended) In a method of computing an elliptic curve digital signature requiring a point multiple for use in a cryptographic system, the improvement comprising computing said point multiple by the steps of:
 - a) obtaining a pair of coefficients derived from a truncator of said elliptic curve;
 - b) computing a representation of said scalar from said pair of coefficients, said

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scalar, and said truncator of said elliptic curve;

- c) computing said point multiple using said representation of said scalar and an endomorphism of said elliptic curve; and
- d) using said point multiple for computing said elliptic curve digital signature for use in said cryptographic system[[.]];

wherein said truncator is $\frac{\tau^m - 1}{\tau - 1}$ and wherein m is the extension degree of a finite field over which said elliptic curve is defined.

- 11. (original) A data carrier containing computer executable instructions for performing a method according to claim 1.
- 12. (original) A cryptographic system performing a method according to claim 1.

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